CLAIMS

We claim:

1. An isolated and purified bacterial reverse transcriptase (RT) which is capable of synthesizing msDNA, which RT comprises a conserved sequence of amino acid residues as follows: tyrosine, x which is alanine or cysteine, and two aspartic acid residues.

2. The bacterial RT of claim 1 which comprises a second conserved sequence of amino acid residues as follows: serine, x which is a hydrophobic residue selected from the group consisting of valine, phenylalanine, leucine and isoleucine, x_1 which is a polar residue selected from the group consisting of threonine, asparagine, lysine and serine and x_2 which is a hydrophobic residue selected from the group consisting of tryptophan, phenylalanine and alanine.

3. The bacterial RT of claim 2 which comprises a third conserved sequence of amino acid residues as follows: asparagine, x which is a hydrophobic residue selected from the group consisting of alanine, leucine and phenylalanine and x_1 which is a hydrophobic residue selected from the group consisting of leucine, valine and isoleucine.

4. The bacterial RT of claim 3 which comprises a fourth conserved sequence of amino acid residues as follows: x which is a polar residue selected from the group consisting of arginine, glutamic acid, lysine, valine and glutamine, a second residue which is valine, a third residue which is threonine and a fourth residue which is glycine.

5. The bacterial RT of claim 1 which has the common subdomains 1 through 7 shown in Table 5.

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6. The bacterial RT of claim 1 wherein the conserved sequence is located in subdomain 5 shown in Table 5.

7. The bacterial RT of claim 6 which has a total of 61 conserved amino acid residues.

8. An isolated and purified bacterial RT which comprises a sequence of amino acid residues shown in Figure 14.

9. An isolated and purified bacterial RT from a bacterium which is capable of synthesizing an msDNA as determined by the reverse transcriptase extension in vitro screening test, which indicates the presence or absence of msDNA in the bacterium.

10. The bacterial RT of claim 9 wherein the bacterium is selected from the group of genera consisting of Myxococcus, Escherichia, Proteus, Klebsiella, Flexabacter, Cytophaga, Stigmatella, Salmonella, Nannocystis, Rhizobium and Bradyrhizobium.

11. The bacterial RT of claim 10 wherein the in vitro screening test for determining the presence or absence of msDNA in the bacterium comprises treating a preparation of total RNA extracted from the bacterium with a reverse transcriptase (RT) in the presence of a radiolabeled deoxynucleotide, which RT, when msDNA is present in the total RNA of the bacterium, utilizes the DNA portion of the msDNA as a primer and the RNA portion of the msDNA as a template for radiolabeling the DNA portion of the msDNA, electrophoresing the treated RNA preparation and determining the presence of msDNA in the bacterium by detecting a band of radiolabeled DNA, said band being indicative of the presence of msDNA in the bacterium.

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